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CLAIMS

1.   A method for reducing interference from at least one narrow band interferer in a pilot symbol assisted receiver including the steps of;

5   receiving a stream of received data,

passing the stream of received data through an adaptive filter that reduces interference from any narrowband interferer,

passing the filtered data through a correlator arranged to detect pilot symbols,

when a pilot symbol is detected passing the stream of received data to a

10   receiving apparatus without first passing the received data through the adaptive filter,

and wherein the pilot symbol includes one or more repetitions of known data or pseudo noise.

2.   A method for reducing interference from at least one narrow band interferer in a

15   pilot symbol assisted receiver as claimed in claim 1 wherein the number of taps in the adaptive filter is greater than the maximum number of interferers to be cancelled.

3.   A method for reducing interference from at least one narrow band interferer in a pilot symbol assisted receiver as claimed in claim 1 wherein the minimum number of

20   taps in the adaptive filter is one greater than the maximum number of interferers to be cancelled.

4.   A method for reducing interference from at least one narrow band interferer in a pilot symbol assisted receiver as claimed in any one of claims 1 to 3 wherein the

25   adaptive filter is a normalised least means squares (N-LMS) filter.

5.   A method for reducing interference from at least one narrow band interferer in a pilot symbol assisted receiver as claimed in any one of claims 1 to 4 wherein the adaptive filter uses a delayed stream of the received data as a reference signal.

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6.   A method for reducing interference   from at least one narrow band interferer in a pilot symbol assisted receiver as claimed in claim 5 wherein the length of the delay in the delayed stream of received data is longer than the length of the pilot symbol.

7.   A method for reducing interference from at least one narrow band interferer in a pilot symbol assisted receiver as claimed in any one of claims 1 to 6 wherein the step of detecting a pilot symbol in the correlator includes the steps of;

        detecting a peak in a sliding correlator and,

        when the peak is detected in the sliding correlator operating a pilot symbol detector to detect the pilot symbol.

8.   A method for reducing interference from at least one narrow band interferer in a pilot symbol assisted receiver as claimed in claim 7 wherein the step of detecting a pilot symbol further includes the step of timing out if a pilot symbol is not detected in the pilot symbol detector within a predetermined number of operations.

9.   A method for reducing interference from at least one narrow band interferer in a pilot symbol assisted receiver as claimed in claim 8 wherein when a timeout occurs continuing to search for a peak with the sliding window correlator and when a peak is detected in the sliding window correlator operating a pilot symbol detector to detect the pilot symbol.

10.   A method for reducing interference from at least one narrow band interferer in a pilot symbol assisted receiver as claimed in any one of claims 7 to 9 wherein the pilot symbol detector is a matched filter.

11.   A method for detecting a pilot symbol in the presence of narrowband interference using a receiver including the steps of;

        receiving a stream of received data,

        passing the stream of received data through an adaptive filter to reduce interference from any narrowband interferers,

        passing the output of the adaptive filter to a correlator,

when the correlator produces a peak over a threshold value triggering a pilot symbol detector to search for a pilot symbol in the filtered data,

triggering a timeout during which the pilot symbol detector will not operate if the pilot symbol detector does not detect a pilot symbol in the filtered data without a predetermined number of operations, and

sending a signal that triggers removal of the adaptive filter from the receiver path if the pilot symbol detector detects a pilot symbol in the filtered data within the predetermined number of second correlator operations,

and wherein the pilot symbol includes one or more repetitions of known data or pseudo noise sequence.

12.   A method for detecting a pilot symbol in the presence of narrowband interference in a receiver as claimed in claim 11 wherein the correlator is a sliding window correlator.

13.   A method for detecting a pilot symbol in the presence of narrowband interference in a receiver as claimed in claim 11 or claim 12 wherein the pilot symbol detector is a matched filter correlator.

14.   A method for detecting a pilot symbol in the presence of narrowband interference in a receiver as claimed in any one of claims 11 to 13 wherein the number of taps in the adaptive filter is greater than the maximum number of interferers to be cancelled.

15.   A method for detecting a pilot symbol in the presence of narrowband interference in a receiver as claimed in any one of claims 11 to 13 wherein the minimum number of taps in the adaptive filter is one greater than the maximum number of interferers to be cancelled.

16.   A method for detecting a pilot symbol in the presence of narrowband interference in a receiver as claimed in any one of claims 11 to 15 wherein the adaptive filter is a normalised least means squares (N-LMS) filter.

17.   A method for detecting a pilot symbol in the presence of narrowband interference in a receiver as claimed in any one of claims 11 to 16 wherein the adaptive filter uses a delayed stream of the received data as a reference signal.

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18.   A narrowband interference reducing system for a receiver including;

        a front end arranged to receive data,

        an adaptive filter arranged to filter narrowband interference from the received data and provide filtered data,

10   a correlator arranged to detect pilot symbols in the filtered data, and

        a logic system arranged to reroute the received data to a receiving apparatus when a pilot symbol has been detected, and wherein

        the pilot symbol includes one or more repetitions of known data or pseudo noise sequence.

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19.   A narrowband interference reducing system for a receiver as claimed in claim 18 wherein the number of taps in the adaptive filter is greater than the maximum number of interferers to be cancelled.

20   20.   A narrowband interference reducing system for a receiver as claimed in claim 18 wherein the minimum number of taps in the adaptive filter is one greater than the maximum number of interferers to be cancelled.

21.   A narrowband interference reducing system for a receiver as claimed in any one
25   of claims 18 to 20 wherein the adaptive filter is a normalised least means squares (N-LMS) filter.

22.   A narrowband interference reducing system for a receiver as claimed in any one of claims 18 to 21 wherein the adaptive filter uses a delayed stream of the received data
30   as a reference signal.

23. A narrowband interference reducing system for a receiver as claimed in claim 22 wherein the length of the delay in the delayed stream of received data is longer than the length of the pilot symbol.

5   24. A narrowband interference reducing system for a receiver as claimed in any one of claims 18 to 23 wherein the correlator is a sliding window correlator.

25. A narrowband interference reducing system for a receiver as claimed in any one of claims 18 to 24 further including a matched filter correlator.

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26. A narrowband interference reducing system for a receiver as claimed in claim 25 wherein when a peak is detected in the sliding correlator operating the matched filter correlator to detect the pilot symbol.

15   27. A narrowband interference reducing system for a receiver as claimed in claim 26 wherein the logic system is arranged to produce a timeout if a pilot symbol is not detected in the matched filter correlator within a predetermined number of matched filter correlator operations.

20   28. A narrowband interference reducing system for a receiver as claimed in claim 27 wherein when a timeout occurs the sliding window correlator continues operating and when a peak is detected in the sliding window correlator the matched filter correlator begins operating.

25   29. A narrowband interference reducing system for a receiver as claimed in claim 28 wherein the logic system is arranged to bypass the adaptive filter when the matched filter correlator detects a pilot symbol.